REMARKS

The Non Final Office Action mailed December 28, 2007 has been reviewed and carefully considered. The Examiner's reconsideration is respectfully requested in view of the following remarks. Claims 1-9 are pending in the present application. Claims 1 and 3-9 have been amended. Claims 10-16 have been withdrawn by the Examiner. No new matter has been introduced.

I. RESTRICTION REQUIREMENT

As per the telephone conversation with Examiner Hanor on 12/12/07, Applicants herewith affirm the election, with traverse, of claims 1-9 in Group I, directed to a process for producing a stable solution containing anatase titanium oxide.

Applicant traverses the restriction requirement for at least the following reasons:

The Examiner states that the inventions listed as Groups I, II, III and IV do not relate to a single general inventive concept because they lack the same or corresponding special technical feature, to which the Applicant respectfully disagrees. Namely, claims 1-16 of each of the Groups I, II, III and IV include the novel concepts of, *inter alia,* preparing an initial stabilized peptized solution including a titanium precursor material, an organic solvent, an acid agent; mixing said initial solution with water in such a manner that the molar ratio of water-to-titanium of the obtained intermediate solution is greater than 0.8, the quantity of acid agent in said initial solution being such that the pH of said intermediate solution is less then 3; and exchanging water by an organic solvent with a lower surface tension than water to obtain a final solution. These elements are NOT shown or suggested in the prior art. It is noted that the stabilization of the peptized solution is advantageous to the present invention, as the obtained solution would

otherwise not be able to be coated to obtain a transparent layer. *See* page 5, lines 2-14 of the specification.

Thus, claims 1-16 of the present invention involve a fundamentally different process from, and are therefore novel over the prior art. It is accordingly asserted that at least one special technical feature exists which defines a contribution which each of the claimed inventions considered as a whole makes over the prior art. The examination of the Groups I, II, II, IV together in this application is thus appropriate for at least the reasons described above and would not cause undue burden on the Examiner.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the Restriction Requirement.

Alternatively, should the Examiner disagree and not withdraw the restriction requirement in its entirety, it is respectfully requested that the Examiner reconsider that at least Groups I, II and III should be examined together.

CLAIM OBJECTIONS

Claims 4-9 were objected to under 37 C.F.R. 1.75(c) as being in improper multiple dependent form. Applicant has amended claims 4-9 to delete the multiple dependencies. Withdrawal of this objection is respectfully requested.

§103 REJECTIONS

By the Office Action, the Examiner rejected claims 1-3 under 35 U.S.C. §103(a) as being unpatentable over EP 1,167,296 (hereinafter EP '296) in view of U.S. Patent No. 5,593,737 to Meinzer et al. (hereinafter Meinzer).

The Applicant respectfully disagrees with the rejection.

With respect to EP '296, this reference describes three different inventions, and for each invention many examples are given. Each of the three inventions of EP '296 will be summarized below:

Invention 1: (*see* e.g., paragraphs [0037] to [0051] and [0082] to [0088]

A process for producing anatase titanium oxide powder is described as follows:

- An initial solution is prepared with a titanium precursor material (see [41]) an organic solvent (see [49]) and possibly an acid agent (see [50]).

- The initial solution is then hydrolysed by addition of water (see [0022] and [0052]). As an example given in [0111], the molar ratio of water-to-titanium is approximately 3 and the PH is about 4.9 (see [118]).

Then the obtained solution is heat-treated at a temperature between 80 and 250°C and the powder is thus obtained.

However, the first invention of EP '296 fails to disclose or suggest at least the following elements of the process claimed in claim 1 of the present application, namely:

* The initial solution is not stabilized: nowhere is it stated in EP '296 that the initial solution is stabilized (for example, by aging and/or by presence of a small amount of water). In EP '296, water is only added once, not in 2 different steps as in an especially preferred embodiment of the present invention.

* The quantity of acid agent is not added in such a way that after water has been added, the pH is less than 3.

* There is no step of exchanging water by an organic solvent with lower surface tension than water to obtain a final solution.

* There is no step of dispersing the final solution. Note that EP '296 teaches only a single dispersing step - dispersing of a heat treated product – whereas, the process of the present invention involves two dispersing steps (dispersing of a heat treated intermediate solution, and dispersing of a final solution having a lower surface tension).

Therefore the process of claim 1 is not disclosed or suggested by the first invention of EP '296.

Invention 2: (*see* e.g., paragraphs [0052] to [0070]) and [0089] to [0094]

A process for producing anatase titanium oxide powder is described as follows:

- An initial solution is prepared with a titanium precursor material (*see* [0065]) and possibly an acid agent (*see* [0067] and [0090]).
- The initial solution is hydrolysed by addition of water (which also contains peroxide) (*see* [0089]). Nothing is said about the pH of the intermediate solution and no example is given nor any disclosure or suggestion made with regards to addition of acidic agents.
- Then the obtained solution is heat-treated at a temperature between 120 and 270°C (*see* paragraph [0060]) and the anatase titanium oxide powder is thus obtained.

However, the second invention of EP '296 fails to disclose or suggest at least the following elements of the process claimed in claim 1 of the present application, namely:

* There is no organic solvent in the initial solution.

* The initial solution is not stabilized. Nowhere is it stated in EP '296 that the initial solution is stabilized (for instance by aging or by presence of a small amount of water, as in the present invention. Note that water —which also contains peroxide- is

added only once in the second invention of EP '296, whereas according to one especially preferred embodiment of the present invention, water is added in 2 different steps).

* The quantity of acid agent is not added in such a way that after water has been added, the pH is less than 3.

* There is no step of exchanging water by an organic solvent with lower surface tension than water to obtain a final solution.

* There is no step of dispersing the final solution. Note that EP '296 teaches only a single dispersing step - dispersing of a heat treated product – whereas, the process of the present invention involves two dispersing steps (dispersing of a heat treated intermediate solution, and dispersing of a final solution having a lower surface tension).

Therefore the process of claim 1 is not disclosed or suggested by the second invention of EP '296.

Invention 3: (*see* e.g., paragraphs [0071] to [0080] and [0095] to [[0109]:

A process for producing anatase titanium oxide solution is described as follows:

- An initial solution is prepared with a titanium precursor material (see [0074]), an organic solvent (*see* [0076]) and possibly an acid agent (*see* [0078] and [0101]).
- The initial solution is hydrolysed by addition of water (*see* [0075] and [0095]). As an example given in [0111], the molar ratio of water-to-titanium is approximately 3.
- The solution is then treated with ozone gas (*see* [0072]).

However, the third invention of EP '296 fails to disclose or suggest at least the following elements of the process claimed in claim 1 of the present application, namely:

* The initial solution is not stabilized. Nowhere is it stated in EP '296 that the

initial solution is stabilized (for example by aging or by presence of a small amount of water as in the present invention). For example, in EP '296 water is added only once, not in 2 different steps as per one of the embodiments of the present invention).

* The quantity of acid agent is not added in such a way that after water has been added, the pH is less than 3.

* There is no heat treatment.

* There is no step of exchanging water by an organic solvent with lower surface tension than water to obtain a final solution.

* There is no step of dispersing a heat treated intermediate solution, nor dispersing of the final solution.

Therefore the process of claim 1 is not disclosed or suggested by the third invention of EP '296.

Advantageously, the above-mentioned differences have various effects, which together tend to the desired result of the present invention, i.e. to provide a stable solution containing anatase titanium oxide which can be deposited on a substrate in order to obtain a transparent photo-catalytic coating. Indeed,

- the stabilization of the initial peptized solution is critical to the present invention, otherwise the obtained solution would not be able to be coated to obtain a transparent layer, as explained in the specification e.g., on page 5, lines 1-24.
- a pH less than 3 is necessary in order to catalyze the hydrolysis reaction and thus allow proper crystallization, as explained in the specification e.g., on page 6, lines 2-15. This enables obtainment of a perfectly transparent solution.
- the exchanging step improves the deposition capability of the solution on homogeneous films, as explained in the specification, e.g., on page 8, lines 10-14.

Significantly, note that since the processes in accordance with the first and second inventions of EP '296 do not comprise the above-mentioned steps, a powder is obtained, but NOT a solution which can be deposited on a substrate in order to obtain a transparent photo-catalytic coating, as in the present invention.

Moreover, since the process in accordance with the third invention of EP '296 also does not comprise the above-mentioned steps, it further requires use of ozone in order to be able to obtain a solution, which may cause problems in the security on the industrial process. Furthermore, the solution obtained by means of the process of the third invention of EP '296 has a poor photo-catalytic effect, as implicitly admitted in paragraph [0102].

It is respectfully asserted that Meinzer fails to cure the deficiencies of EP '296. Meinzer involves a method for coating a substrate with a photocatalytic semiconductor by mixing photocatalytic semiconductor powder with water to form a mixture, reducing said pH of the mixture to below about 4, emulsifying the mixture, coating the substrate therewith and illuminating the coated substrate with ultraviolet. Claim 1 of Meinzer recites:

> 1. A method for coating a substrate with photocatalytic semiconductor, comprising:
>
> a. mixing photocatalytic semiconductor powder with water to form a mixture having a pH;
>
> b. acidifying said mixture to inhibit agglomeration of said powder;
>
> c. sonicating said mixture to disperse said powder;
>
> d. coating the substrate with said sonicated mixture; and
>
> e. illuminating said coated substrate with UV to dry and harden said coating, wherein such drying and hardening is accomplished without substantially heating said coated substrate.

However, Meinzer fails to disclose or suggest at least preparing an initial stabilized peptized solution, mixing said initial stabilized solution with water to obtain an

intermediate solution, heat treating the intermediate solution, dispersing the heat treated intermediate solution, exchanging water by an organic solvent to obtain a final solution and dispersing the final solution, essentially as claimed in claim 1. Nowhere is it stated or suggested in Meinzer to provide an initial **stabilized** peptized solution which includes a titanium precursor material, an organic solvent and an acid agent. As described in the present invention, such stabilized peptized solution may be stabilized by the presence of a small amount of water and/or by aging at room temperature. This stabilization of the initial solution advantageously allows for good achievement of peptization. Furthermore, there is no disclosure or suggestion in Meinzer of mixing said initial **stabilized solution** with **water** such that the molar ratio of water to titanium is greater than 0.8, essentially as claimed in claim 1. Instead, in Meinzer a semiconductor **powder** (NOT a solution, much less a stabilized peptized solution) is simply mixed with water to form a mixture, which is then acidified, dispersed, and summarily coated onto a substrate.

While Meinzer mentions the further step of reducing the surface tension of its mixture via the addition of alcohol, this is not to be confused with **exchanging water** by an organic solvent with a lower surface tension than water, as in claim 1. Significantly, it is noted that the exchanging step of claim 1 is performed on a ***heat-treated intermediate solution***, which, as discussed above, is not taught or suggested in Meinzer.

Indeed, as Meinzer makes no mention of any heat treating step whatsoever, it follows that it cannot possibly teach or suggest dispersing a heat treated solution, as claimed in claim 1.

Accordingly, claim 1 is believed to be patentable and nonobvious in view of EP '296 and/or Meinzer for at least the reasons stated above. Claims 2-3 depend from and include all the limitations of claim 1, and are thus believed to be allowable for at least the

reasons given for claim 1. It is noted that claims 4-9 have been amended to depend from claim 1, and are thus believed to be allowable as well. Withdrawal of the 103 rejection is earnestly requested.

CONCLUSION

For at least the above reasons, at least claims 1-9 in the case are believed to be in condition for allowance. Early and favorable consideration is respectfully solicited.

It is believed that no additional fees or charges are currently due. However, in the event that any additional fees or charges are required at this time in connection with the application, they may be charged to applicant's representatives Deposit Account No. 14-1270.

Respectfully submitted,

Dated: _____ By: _____
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